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ABSTRACT

Preliminary findings are reported from a study examining changes in preschool-aged child communication skill occurring when parents were trained to apply one of two procedures: milieu teaching and responsive-interactive teaching. Three families participated in milieu language training in which the adult uses naturally occurring situations as opportunities to teach language, and three families participated in responsive interaction training, which aims to enhance the quality and richness of parent-child communication as a basis for stimulating child language development. Results suggest that parents can learn to use the milieu and responsive interaction procedures and that children derive benefits from increased parent competence in communicating with their children. While milieu teaching appears more useful in developing specific language targets, response interaction shows some evidence of stimulating general child language behaviors. It is concluded that a hybrid intervention that blends the effective components of milieu and responsive interaction would be optimal. (JDD)

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Toward a Hybrid Model of Parent-Implemented Language Intervention: Analysis of the Effects of Milieu And Responsive-Interaction Teaching By Parents

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During the last three years we have conducting a series of studies comparing the outcomes of language interventions for preschool handicapped children. Our intent in conducting these studies was to identify the child characteristics associated with optimal outcomes in three theoretically diverse treatments. The three treatments we have studied are didactic or behavioral instruction using the Communication Training Program (Waryas and Stremel-Campbell, 1983), Milieu Teaching (Kaiser, Hendrickson & Alpert, in press) and Responsive-Interactive Teaching (based on the INREAL Model; Weiss, 1985).

In the first study in this series, we compared Milieu Teaching and Didactic Instruction when administered by trained intervenors in a classroom setting with groups of three children (Yoder, Kaiser & Alpert, in press). Forty children preschool aged (2 1/2 years to 6 years at the start of the study) handicapped children ranging from moderately retarded to cognitively normal, but language delayed participated in the training which lasted about 4 months (60 sessions of training). The results showed that were no significant differences in outcomes between the two treatments, but that children with particular characteristics did relatively better in one or the other treatments. Children who did not talk much (fewer than. 45/ utterances per minute), did not self-initiate often (less than 18% of their utterances were imitated) were not very intelligible (less than 45% of utterances were at least partially intelligible), and used a restricted vocabulary were likely to

have benefitted more from the Milieu Teaching method. In contrast, children who self-initiated frequently (greater than 65% of utterances were imitated) and were highly intelligible (at least 95% of their utterances were intelligible) were likely to have benefitted more from Didactic instruction.

In the second study, we compared Milieu Teaching and Responsive-Interactive Teaching when administered across the day by teachers in six classrooms (Kaiser, Goldstein, Yoder, Alpert, Mous[illegible] and Fischer, in preparation). The results of this study showed a similar pattern. There were no main effects for group, suggesting that neither treatment was on the average superior for all children. In general, Milieu Teaching appeared to be more effective for developmentally younger children and Responsive-Interaction appeared more effective for developmentally older children. For example, developmentally young children (MLU less than 1.30) who don't talk much (fewer than 2.37 utterances per minute) Milieu Teaching facilitated receptive language development (SICDR) and responsiveness better than Responsive Interaction. For developmentally older children (i.e., MLU greater than 3.13 and language age above 35 months), responsive interaction facilitates receptive language development (as measured by SICDR and PPVT) better than Milieu. (Note: the six interaction effects obtained in this study require a much more detailed presentation than is given here; please interpret these data very cautiously.)

We are now conducting a third study examining the effects of

Milieu Teaching and Responsive-Interactive Teaching when applied by parents. In this study, we are examining changes in child communication skill occurring when parents are trained to apply one of the two procedures across 20 session. The study is ongoing and will ultimately involve 36 families in group comparison. Today, I would like to report some preliminary, single subject data six families.

Within the single subject designs, the following questions are examined: First, does parent interaction style change from baseline to the end of training, specifically, are parents able to learn the content of the intervention program? And secondly, does the intervention program facilitate an increase in child intentional communicative utterances and acquisition of specific language targets?

I. Milieu Language Teaching in Parent-Based Intervention

In the first study, three families participated in Milieu Language Training in which the adult uses naturally occurring situations, for example child requests, as opportunities to teach language when the child's interest and motivation are high (Hart & Risley, 1975). The parent follows the child's interest and teaches language by providing specific prompts, and correction and reinforcement for child responses.

The content of Milieu Language Teaching is outlined in Table 1 and includes: (1) child-directed modeling in which the parent

Insert Table 1 About Here

provides a language model for the child to imitate; (2) the Mand-Model Procedure in which the child is first presented with a verbal mand related to the focus of the child's attention; (3) the Time Delay Procedure which incorporates a nonverbal cue, usually a pause in activity, when the child needs assistance or materials, to prompt a response; and (4) Incidental Teaching in which the parent recognizes and uses child requests for attention or assistance as opportunities to teach language, and then employs one of the other three procedures.

Subjects. Child and parent characteristics for families randomly assigned to Milieu Language Training are presented in Table 2.

Insert Table 2 about here

The children ranged in age from 28 to 40 months and demonstrated an 8-month expressive language delay as measured by their scores on Expressive Scale of the Sequenced Inventory of Communication Skills (SICD). Mothers ranged in age from 34 to 45 and had completed high school or college.

Method

Setting. Baseline and parent-child training sessions occurred in therapy rooms at the John F. Kennedy Center at

C

Peabody College/Vanderbilt University.

Design. A multiple baseline design across three subjects was implemented. Pre- and post-test measures of child language skills were also taken.

Measures. With respect to parent use of Milieu Language Teaching, the current paper will focus on variables: the frequency and percent of correct teaching episodes; and the frequency and percent of correct episodes which taught targets. The child measure to be examined is the frequency of prompted and spontaneous use of targets.

These measures were derived from 15 minute videotaped interactions between parent and child using the Milieu Teaching Code (Alpert & Kaiser, 1985). Only ten minutes of each 15 minute sample was coded. Each instance of relevant parent and child behaviors was recorded in sequence. In addition all child prompted and spontaneous utterances were transcribed.

Procedure. Each family participated in three experimental conditions: baseline, intervention, and followup. The current paper will discuss data for the baseline and intervention phases of the study. Concurrent with the baseline, language skills were assessed using the SICD, two 30-minute language samples at the beginning and end of baseline, and the Rescorla vocabulary checklist. Only children who had at least a five-word expressive vocabulary and an expressive or receptive language delay of at least eight months with respect to their chronological age were selected for the study.

During each baseline session, a 15-minute videotaped interaction between parent and child was recorded in a clinic playroom. Parents were instructed to interact with their children as naturally as possible. A standard set of age-appropriate toys was provided.

Intervention consisted of twenty individual sessions, usually conducted twice a week, with trainers who had extensive training in each intervention model and in effective parent training strategies. During each session, feedback on parent performance was provided, new language intervention techniques were discussed and modeled by the trainer, and a 15-minute interaction between parent and child was videotaped. The videotaped interactions were coded before the next session in order to monitor parent and child performance, and to provide guidance to the trainers regarding future training objectives.

Reliability data were collected for one baseline and two intervention sessions--one during the first half of training and one during the second half. Reliability of coding parental and child behaviors was computed using an exact agreement procedure for the occurrence of behaviors in sequence, and was computed separately for parent and child behaviors using the following formula:

$$\frac{\text{Total number of agreements}}{\text{Total number of agreements and disagreements}} \times 100$$

A total of nine reliability checks were conducted. Reliability averaged (is currently being computed and will be reported at

ABA).

Results

Results for the dyads participating in Milieu Language Teaching are presented in Figures 1-3.

Insert Figure 1 about here

In Figure 1, data for the frequency and percent of correct teaching episodes are presented. In order to summarize parent learning, the four milieu language procedures---model, mand-model, time delay, and incidental teaching---were summed, and the frequency and percent of correct procedure use was computed. Frequency of correct use is shown as a line; percent correct is shown with bars. The scale of percent correct is on the right vertical axis. During baseline, families typically completed fewer than ten correct milieu teaching episodes; less than 40% of the total number of milieu episodes were correct.

During intervention the frequency of correct use increased substantially for all families, although all dyads had sessions when frequency of correct use declined to baseline levels. While Dyad A has not completed training, the trend is toward an increasing percent of correct episodes---60 and 80%for the last ten episodes. Dyad B demonstrated modest improvements in the percent of correctly produced episodes and in frequency of correct episodes. Also between 60 and 80%; while Dyad C showed gains, but variable in both frequency and percent correct.

Rarely were more than 60% of Dyad C's episodes correct.

Figure 2 presents the frequency and percent of correct

Insert Figure 2 about here

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episodes which taught targets. Targets were taught in correct episodes rarely, if at all during baseline with the exception of Session 4 for Dyad B. During intervention, the frequency and percent of correct episodes used to teach targets increased for all families. The frequency of correct target teaching during training ranged from 5 to 10 times for Dyads A and C, and about 5 times per session for Dyad B. For all dyads, the percent of correct use ranged from 60 to 100% for about the last half of the intervention sessions. While the frequency of correct episodes which taught targets remained constant for Dyads B and C, the percent of correct use varied considerably.

Figure 3 presents child prompted and spontaneous use of

Insert Figure 3 about here

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targets. Prompted use was defined as a response to a mand or model, while spontaneous use included child production of targets outside milieu teaching episodes and also in response to time delays. Children A and C increased their production of prompted and spontaneous targets; generally they produced a greater number of spontaneously than prompted targets. While Dyad C maintained

a fairly constant rate of target production across the training condition, ranging from five to fifteen targets per session, Dyad A significantly increased spontaneous production after session 13 and has maintained that increase. Dyad B demonstrated only modest increases in prompted target production, and no change in spontaneous production in training as compared to baseline.

Discussion

These results suggest that parents can learn to use the Milieu procedures to teach specific language targets, and that children can acquire specific targets when parents are given appropriate training. Longer training, however, may be required to stabilize parent and child performance. Parents in dyads A and B demonstrated fairly consistent performance of correct teaching episodes. Their performance was less consistent with respect to percent of correct episodes which taught targets. In part, increases in correct episodes to teach targets reflected parents becoming more proficient over time with correcting child responses within target teaching episodes. Dyad C's data was variable for both parent and child measures. It is important to point out that Dyad C's attendance was inconsistent, and that training lasted almost eight months with periods of absenteeism lasting from two to four weeks. A critical feature of parent training may be not only length of training but also consistency such that behaviors can be shaped and reinforced on a frequent basis.

II. Responsive Interaction in Parent-Based Intervention

The second study examined changes in parent interaction style, child acquisition of specific language targets, and increases in child intentional communicative utterances for three families who participated in Responsive Interaction training. The goal of Responsive Interaction is to enhance the quality and richness of parent-child communication as a basis for stimulating child language development (Weiss, 1981). When the parent responds to the child's communicative attempts contingently, a prime opportunity is provided for language learning.

In contrast to Milieu Language Teaching, Responsive Interaction does not use verbal and nonverbal prompts for child responses. The parent provides a nonmanding model and an opportunity for the child to continue the conversation verbally. No attempt is made to ask the child to answer questions or imitate language models. Responsive Interaction encompasses the philosophy "communication, and not correction, facilitates language growth."

The content of Responsive Interaction is outlined in Table 3.

Insert Table 3 about here

The use of S.O.U.L. allows the parent an opportunity to observe and "tune into" the child's play at the child's level. Thus, the parent does not intrude, but rather enters into play with the child, allowing the child to lead the activity. Strategies to

react to the child at a verbal and nonverbal level include vocal monitoring and reflecting, expanding the child's utterances, and mirroring or imitating the child's nonverbal behaviors, for example, gestures or clapping. This last technique has been especially effective for developing an initial format for conversation between parents and nonverbal children. Descriptive talking strategies include parallel talk about what the child is doing, thinking, and feeling; self talk about the parent; and on-topic modeling about the ongoing activity. Finally, the use of pause after parent and child utterances allows the child to take a turn and respond to a parent comment or to continue the child's own turn.

Subjects. Child and parent characteristics for families who were randomly assigned to Responsive- Interaction training are presented in Table 4.

Insert Table 4 about here

All three subjects were three-years old and demonstrated expressive language delays ranging from 12 to 18 months. Parents' ages ranged from 28 to 32 years. Two completed high school while one completed college.

Method

The setting, design, and procedure were similar to that for the Milieu families. Parent use of Responsive Interaction techniques was assessed by measuring three variables: (a)

frequency of parent utterances which attempted to recruit the child's attention away from the child's focus of interest or which narrated topics not related to the activity; (b) frequency and percent of Level One responses to child verbal and nonverbal behaviors, (Level one responses were posited to be the most effective language facilitating responses within the Responsive-Interaction Model. These responses included descriptive talk, repeat, expansion, and clarification of child utterances, and mirroring of nonverbal child behavior---as compared to responding to child utterances with questions, instructions, etc); and (c) frequency of descriptive talk, repeat, and expansion of child utterances which modeled the target. Child measures included the frequency of spontaneous target production and frequency of intentional communicative utterances.

As in the previous Milieu study, the measures were derived from videotaped interactions between parent and child using the Combined Code (Alpert, et al., 1989). Reliability data were collected and computed in a manner similar to that employed with the milieu families. A total of nine reliability checks were conducted, and reliability averaged (is currently being computed and will be presented).

Results

Results for the dyads participating in Responsive Interaction training are presented in figures 4-7.

A low number of utterances which do not follow the child's lead reflects the degree to which the parent "tuned into" the

child and used semantically contingent language.

Insert Figure 4 about here

As figure 4 shows, parents in all three dyads were variable during baseline and produced a number of utterances (ranging from 0-55) which failed to focus on the child's activity. The number of utterances which did not follow the child's lead significantly declined following introduction of the intervention and, remained low throughout remainder of training.

Figure 5 shows the frequency and percent of Level One responses to child verbal and nonverbal behavior. Parents

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Insert Figure 5 about here

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demonstrated different patterns of behavior during baseline. Dyad A used very few instances of repeat, expansion, or descriptive talk, less than ten occurrences; parents in Dyads B's and C's use ranged from 10 to 30 utterances, both use of Level 1 response declined over the baseline period. All families increased the frequency of their use of Level 1 responses during intervention, although Parent B's data was quite variable. Dyads A and C showed a consistent upward trend across the intervention period in frequency of descriptive talk, repeat, and expansion. With respect to the percent of Level 1 feedback, (that is, the percent of all feedback that was Level 1) parents demonstrated

only modest gains across training. Usually about 40-60% of their utterances consisted of level one feedback, suggesting that more total feedback at all levels was given across the intervention.

In Figure 6, the use of descriptive talk, repetitions, and

Insert Figure 6 about here

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expansions to model targets is shown. All dyads increased their use of these utterances to model child language targets. Again, Dyad B was more variable than either Dyad A, who demonstrated a small but steady increase in use, or Dyad C who showed a substantial increase in target level utterances, but with variability over time.

Figure 7 examines child performance with respect to both

Insert Figure 7 about here

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frequency of child target use and intentional communicative utterances. The line with squares represents intentional communication, asterisks indicate spontaneous use of targets. Intentional communicative utterances were defined as "any partially or completely intelligible utterance". Unintelligible utterances were excluded with one exception: unintelligible utterances accompanied by a gesture for an object, assistance, or attention. There was no use of spontaneous targets <u>produced</u> by Child A during baseline and training. Dyads B and C demonstrated

minimal gains in spontaneous target production after 10 intervention sessions. Dyads A and C, however, showed substantial gains with respect to intentional communicative utterances while Dyad B showed a slight upward trend with variability across sessions.

Discussion

Like Milieu families, Responsive-Interaction families learned the procedures and used the procedures to teach language targets. During the intervention, parents became more "in tune" with their children as the decrease and stabilization of numbers of utterances which failed to follow the child's lead demonstrated.

Although the frequency of Level 1 feedback increased, the percent of Level 1 feedback as compared to all other feedback remained the same across baseline and intervention.

Increases in spontaneous target production were minimal for Children B and C while production of targets by Child A did not change from baseline to training. An increase in intentionally communicative utterances was demonstrated, however, for all dyads. The failure to increase target use by the child could have resulted from two factors: The children in Responsive Interaction were functioning at a single- and two-word level upon entry to the program. It may be that to get target production at this early stage of language requires a greater length of time than twenty sessions. Second, Responsive-Interaction does not have as its goal the teaching of specific language targets.

Rather it is designed to stimulate general language skills. The increase in child intentional communicative utterances may reflect the stimulation of general communication skills by the parent in Responsive Interaction.

Finally, it should be mentioned that the most variable family, Dyad B also was absent from training for long periods of time, and the variability in performance could have reflected the inconsistent training.

General Discussion

Results suggest that parents are able to learn the content of Milieu Language Teaching and Responsive Interaction, and that children derive benefits from increased parent competence in communicating with their children. While Milieu appears more useful in developing specific language targets, Responsive-Interaction shows some evidence of stimulating general child language behaviors. The long term gains of children remain to be analyzed by pre-post data which are part of the larger study.

Secondly, frequent and consistent attendance appears important for developing skills in both interventions.

Toward a Hybrid Model for Parent-Implemented Language Intervention

While we have generally been seeking to answer the question "Which intervention is better?" in our last three years of research, our work with parents and the results of Study 3 have lead us to conclude that a hybrid intervention that blends the effective components of Milieu and Responsive Interaction would

be a more appropriate alternative. Our reasoning is based on several assumptions: To date, no single theoretical model of intervention has proven fully effective in remediating the social, linguistic and learning deficits of young children with developmental disabilities, alternative models of intervention strategies are needed. An optimal model appears to be one in which social communication is built through interactions with an invested caregiver and salient, but limited episodes of incidental type teaching are focused slightly in advance of the child's current language level. An optimal model of intervention also includes strategies for arranging the environment and the interactional context to be fully supportive of the targeted language intervention.

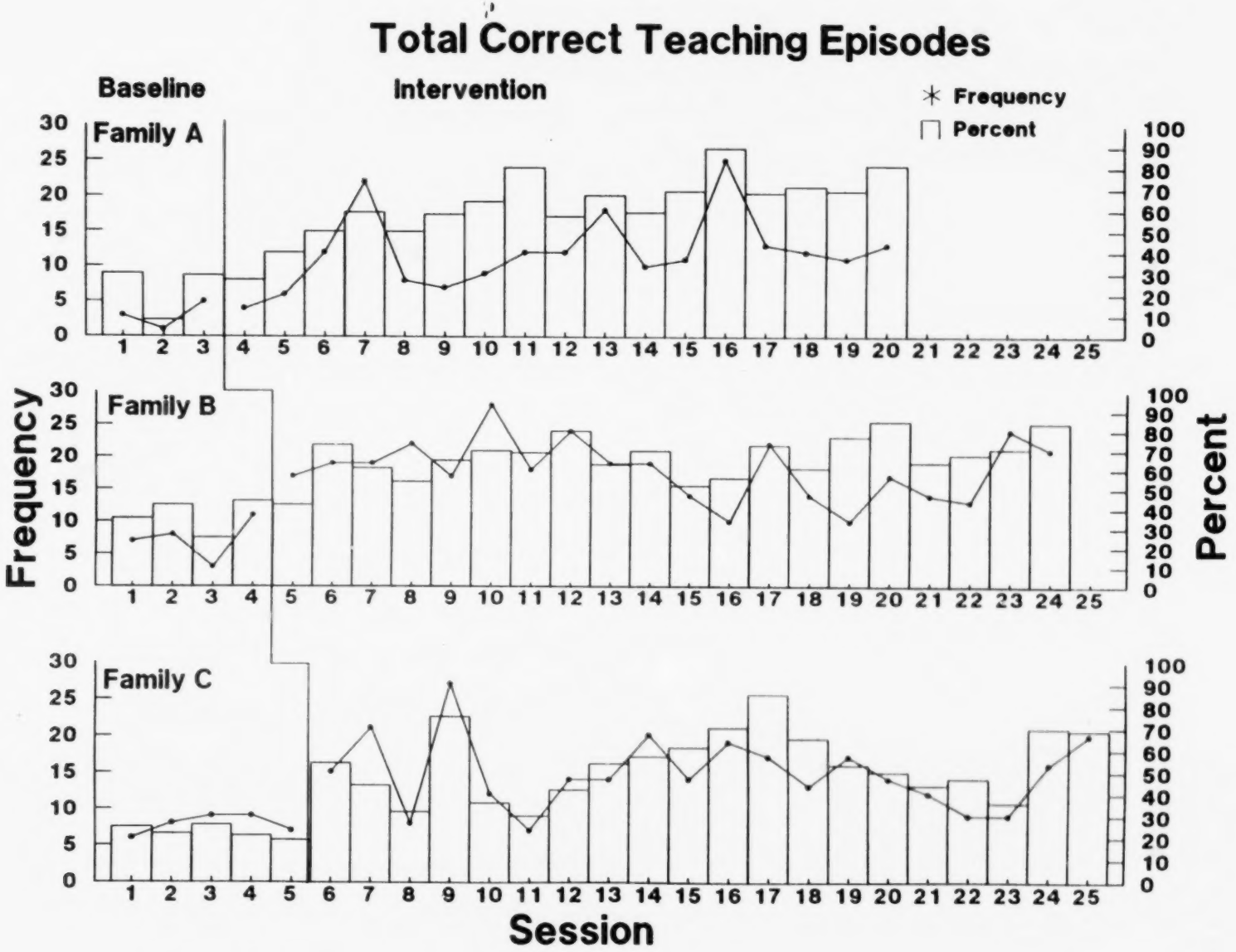
Components of the Hybrid Model. The model is composed of three components: A) Environmental Arrangement; B) Responsive-Interaction; and C) Milieu Teaching. These components are summarized in Table 5.

Insert Table 5 about Here

The hybrid model as a multicomponent intervention has three particular strengths. First, it is a model that is consistent with the parenting role and the family systems context in which parents normally interact with their language learning children. Second, by including the arrangement of the environment as a primary component of the intervention, support for parent

teaching and for child responsiveness to this teaching are built into the model. Thus, the intervention includes procedures to enhance all six aspects of the environmental system thought to be critical to the child's language learning. Third, the multicomponent nature of the model allows the intervention to be tailored to the child's communication skills by emphasizing those aspects of the intervention that most immediately fit the child's learning style and skills. Over time, using the same foundational model of intervention, greater emphasis can be placed on the components of the model that fit the child's developing skills.

Determining the extent to which this hybrid model is able to accomplish the four tasks of language intervention is, of course, an empirical question. We have just begun to conduct research on this model (Cronin, Hemmeter, and Kaiser, in progress).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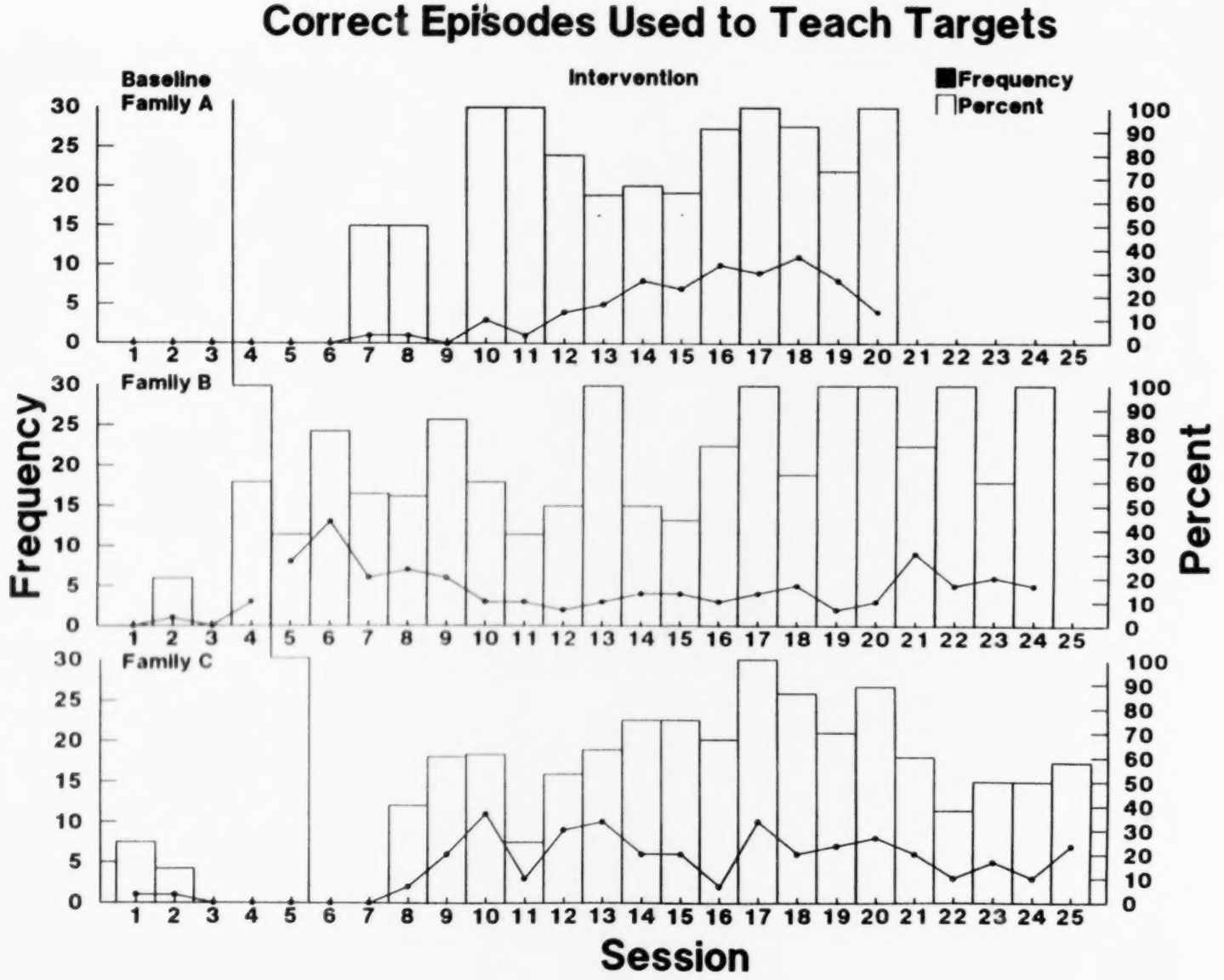
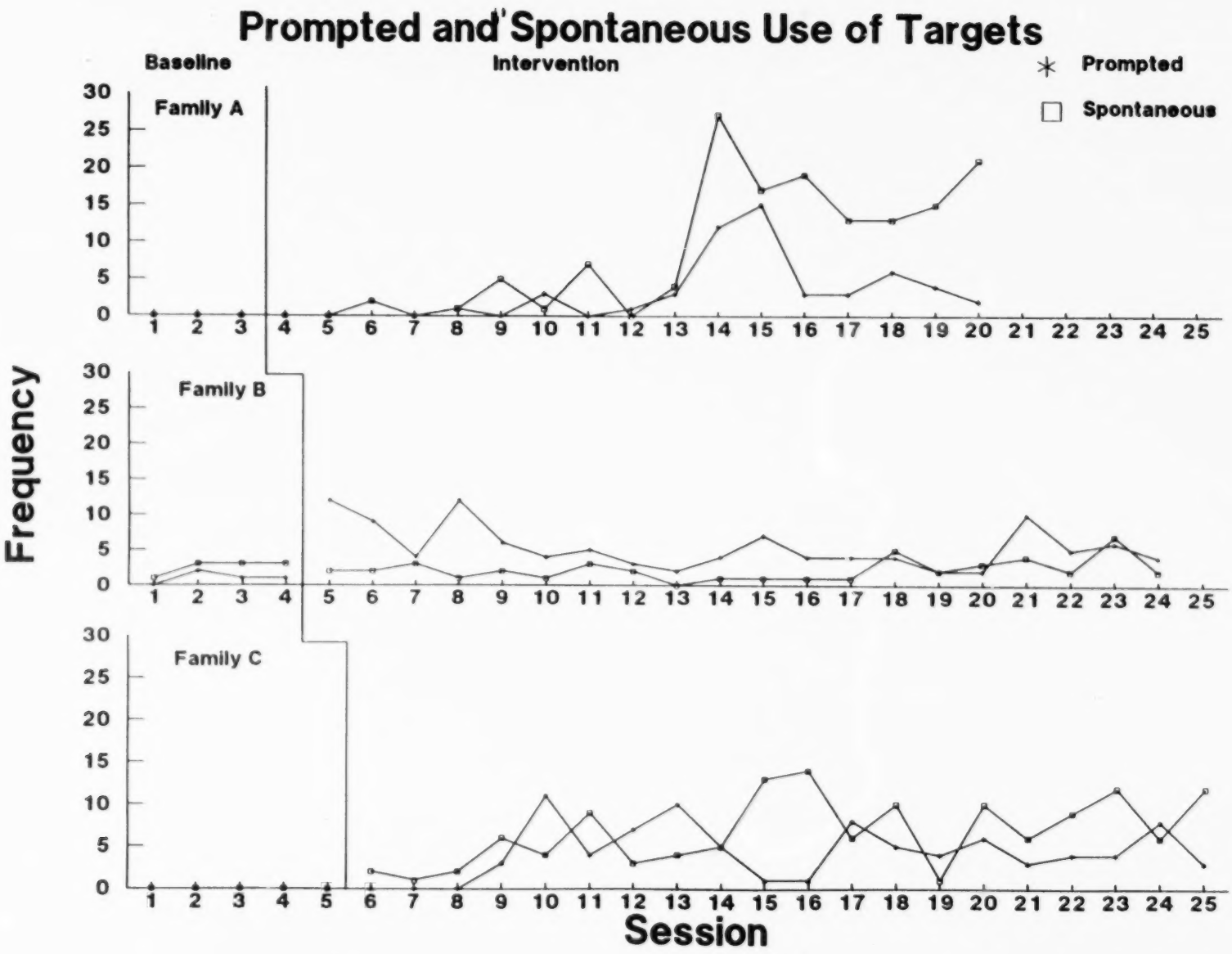
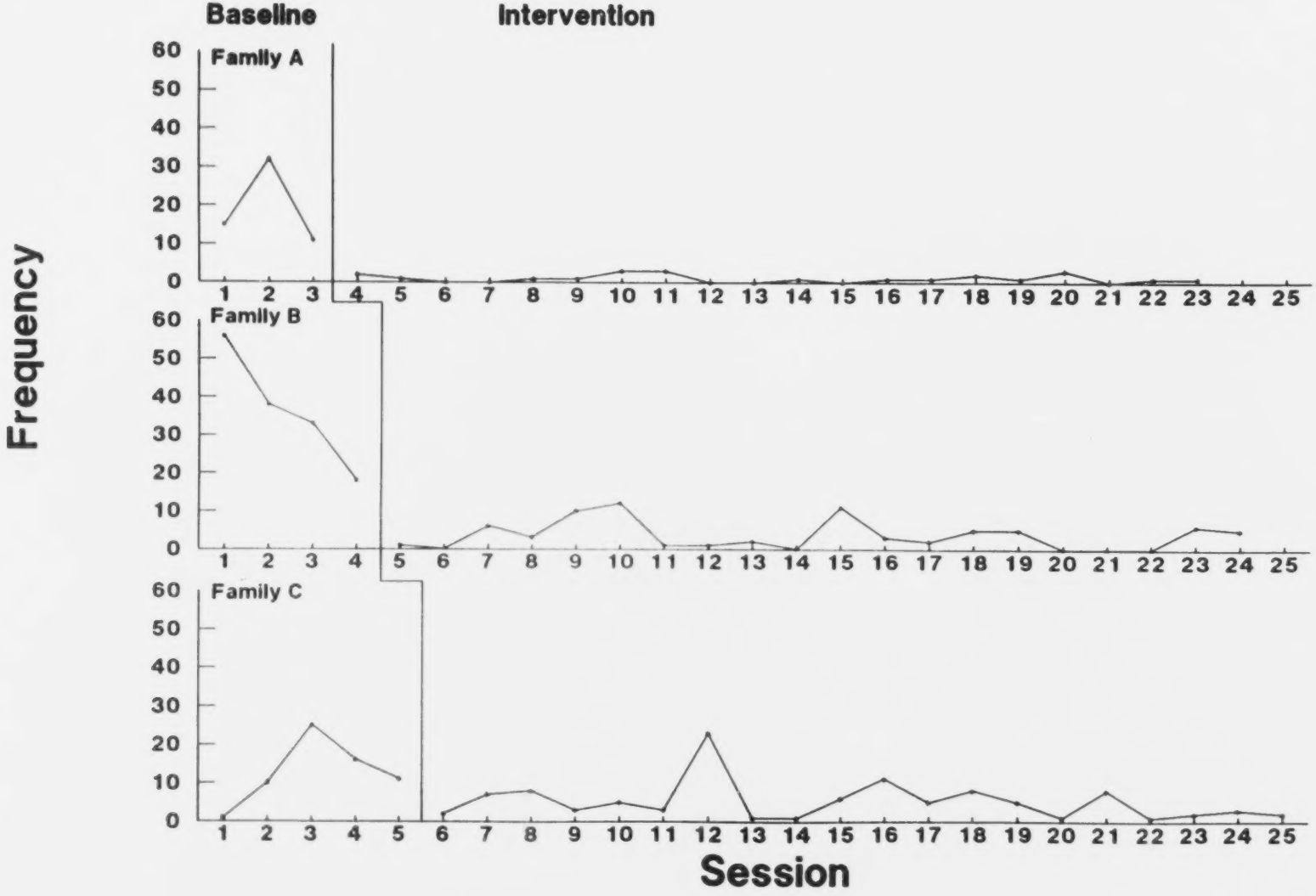
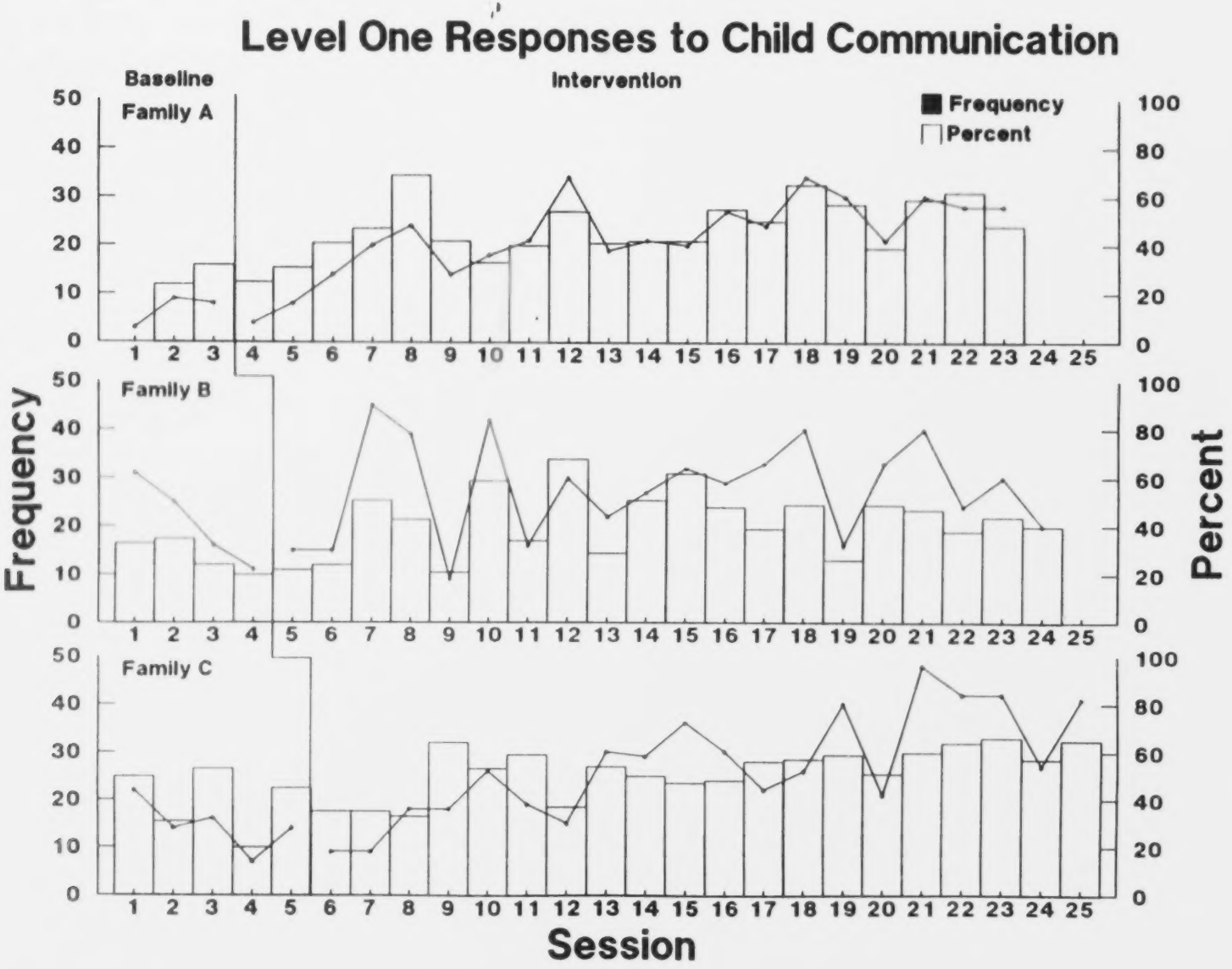
Baseline
Intervention
Frequency
Percent
Family A
Family B
Family C
Frequency
Percent
Session


Correct Episodes Used to Teach Targets
Baseline
Intervention
Frequency
Percent
Family A
Family B
Family C
Frequency
Percent
Session

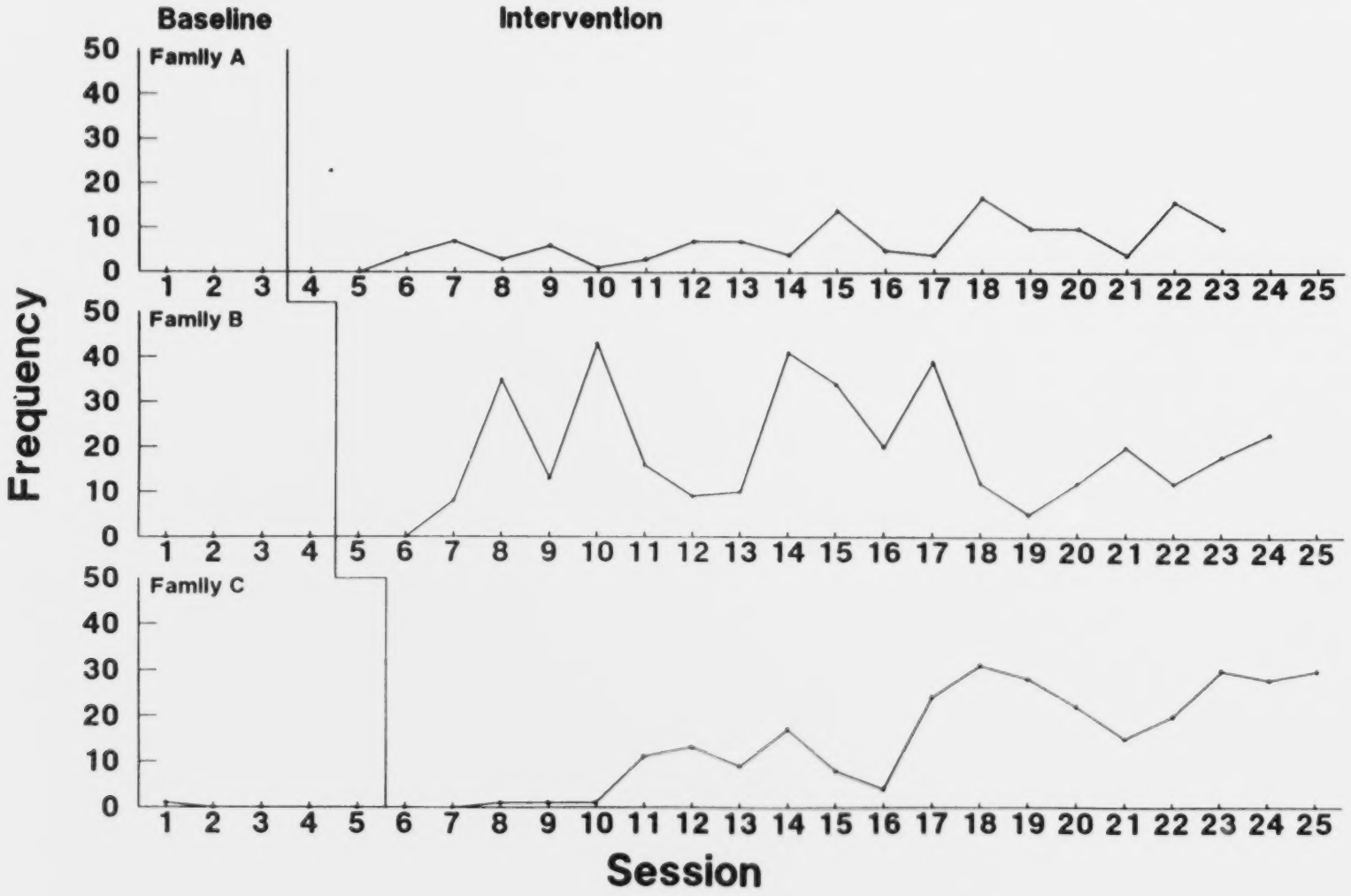

Prompted and Spontaneous Use of Targets
Baseline
Intervention
Prompted
Spontaneous
Family A
Family B
Family C
Frequency
Session

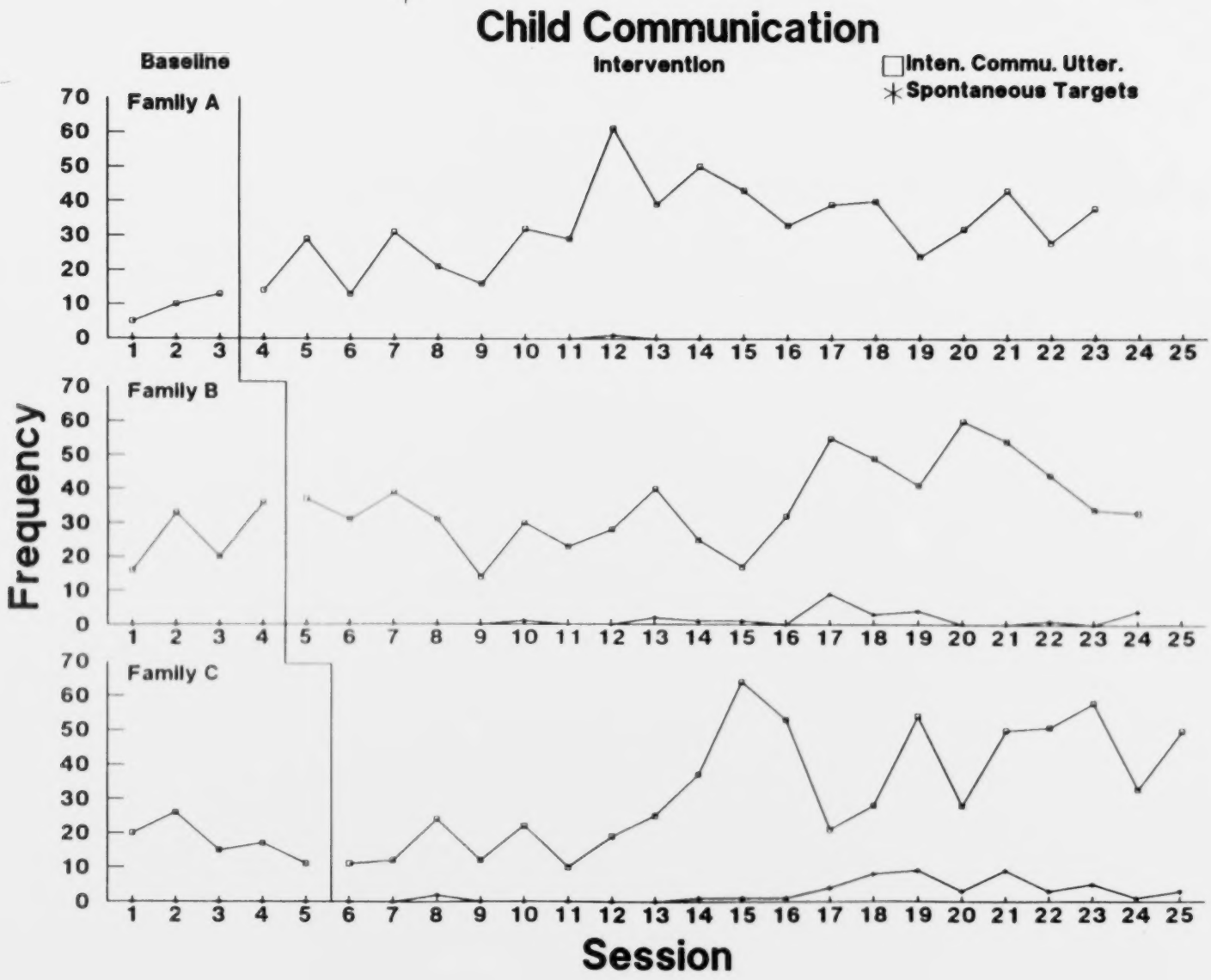
Parent Utterances That Do Not Follow the Child's Lead




Level One Responses to Child Communication
Baseline
Intervention
Family A
Family B
Family C
Frequency
Percent
Session

Parent Use of Descriptive Talk, Repeats, and Expansions to Model Targets




Child Communication
Baseline
Intervention
Inten. Commu. Utter.
Spontaneous Targets
Family A
Family B
Family C
Frequency
Session

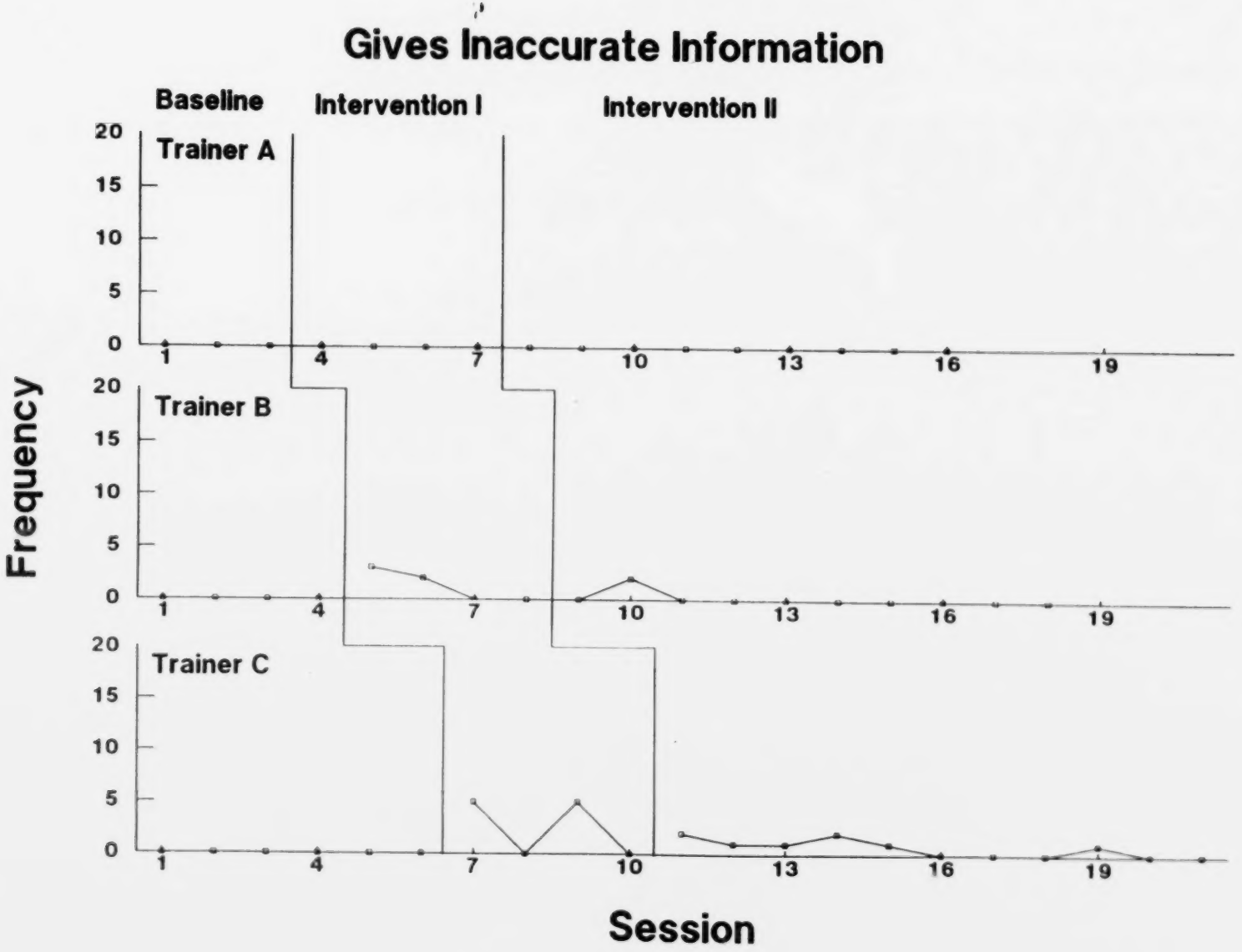

Gives Inaccurate Information
Baseline
Intervention I
Intervention II
Trainer A
Trainer B
Trainer C
Frequency
Session
0
5
10
15
20
1
4
7
10
13
16
19

Table 1

The Content of Milieu Language Teaching

1. **Model Procedure**
2. **Mand-Model Procedure**
3. **Time Delay Procedure**
4. **Incidental Teaching**

Table 2

Subject Characteristics for Milieu Families

	Child Age	Sex	Handicapping Condition	Language Age*	Language Targets	Parent Age	Parent Education
Dyad A	36 months	M	Language Delay	28 months	-Action (3 Const.) -Loc. Action (3 Const.) -Loc. State (3 Const.) -Action + Intention -Pronouns "I", "He", "She"	34	Technical
Dyad B	40 months	F	Language Delay	32 months	-Attribution + Existence -Infinitive Phrase -Compound "-- & --"	45	High School
Dyad C	28 months	M	Language Delay	20 months	-Action (2 Const.) -Loc. Action (2 Const.) -State (2 Const.) -Recurrence + Noun	36	College

* As measured by the SICD Expressive Scale

Table 3

The Content of Responsive Interaction

1. **S.O.U.L. -**
   Silence, Observation, Understanding, Listening
2. **Strategies to React to the Child**
   - **Vocal Monitoring**
   - **Expansion**
   - **Mirroring**
3. **Descriptive Talk**
   - **Parallel Talk**
   - **Self Talk**
   - **On-Topic Modeling**
4. **Pause**

Table 4

Subject Characteristics for Responsive Interaction Families

	Child Age	Sex	Handicapping Condition	Language Age*	Language Targets	Parent Age	Parent Education
Dyad A	36 months	F	Language Delay	20 months	-Verbs "Want" and "Open" -Recurrence + Noun	28	High School
Dyad B	38 months	F	Cerebral Palsy	20 months	-Nonexistence + Noun -Loc. Action (2 Const.) -Action (2 Const.)	28	High School
Dyad C	36 months	M	Language Delay	24 months	-Action (1 Const.) -State (1 Const.) -Attribution + Existence -Action (3 Const.) -Loc. Action (3 Const.)	32	College

* As measured by the SICD Expressive Scale

Table 5

TRAINING CONTENT

I. Environmental Arrangement

Selecting materials
Mediating the environment
Arranging the setting to promote engagement
Specific strategies to support child initiations

II. Responsive Interaction Strategies

Principles of conversational interactions
Following child's lead
Establishing turntaking
Encouraging turntaking
Balancing turns
Maintaining Child's topic
Parallel and self-talk
Matching child's complexity level
Expanding and imitating child utterances
Latency, pausing and sustained attention

III. Milieu Teaching Techniques

Child-cued modeling
Mand-modeling
Time-delay
Incidental teaching